

SPICE Products Available to the Planetary Science Community. C. H. Acton¹,

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NASA's **SPICE** system is used as the mechanism for capturing, archiving and disseminating a variety of ancillary and engineering information needed by scientists involved in mission design, observation planning, science **data analysis** and visualization, and correlation of **data** between multiple instruments. SPICE ancillary data includes spacecraft trajectory, target body ephemerides, target size/shape/orientation, spacecraft orientation, instrument mounting and field-of-view geometry, and commands and events associated with the conduct of a mission.

information systems

SPICE is the **standard** for nearly all NASA planetary missions such as Galielo, Clementine, MGS, MPF, MCO, MPL, Cassini, NEAR, DS-1, Stardust, Mars 01 and Genesis. It was ready for use on the Russian MARS 96 mission, and it could be used on ESA's Mars Express or Rosetta, Japan's Nozomi, or other foreign missions. Portions of the engineering data from some previous missions has also been converted into equivalent SPICE kernel files.

While born and nurtured within the planetary science discipline, SPICE components are equally at home in space physics and earth sciences, and even have some application in astrophysics. SPICE has been applied to landers and rovers as well as to orbiters and flybys. It has even been used for earth observations acquired from an airplane.

SPICE data files, often called "kernels," contain fairly primitive data from which numerous quantities of interest can be derived—items such as latitude and longitude, range, smear velocity, lighting angles (phase, incidence, emission), visibility windows, and similar quantities. SPICE kernel files can be easily ported to all popular platforms.

SPICE files are normally generated by active flight projects, although generic SPICE ephemerides for planets, satellites and some comets and asteroids are also available.

A major component of the SPICE system is a large suite of software—the NAIF Toolkit—consisting primarily of a subroutine library named SPICELIB. These subroutines are used to read SPICE kernel files and to compute the derived quantities of most interest to scientists and engineers. The customer integrates appropriate SPICELIB subroutines into an application program designed to accomplish whatever is needed.

The NAIF Toolkit is available in FORTRAN 77 and is now becoming available in C as well. It is ported to and tested on most popular platforms by NAIF staff before being offered to the science community. Some of the environments supported include Sun/SunOS, Sun/Solaris, HP/HPUX, SGI/IRIX, PC/Win95 or NT or LINUX, MAC, NeXT/NeXTSTEP, DEC Alpha/VMS and DEC Alpha/Digital Unix.

In addition to SPICELIB the NAIF Toolkit includes a number of related utility programs, example programs and a large body of documentation. Some separate tutorial packages are also available.

This poster is presented to better inform conference attendees of the SPICE products and services available from the Navigation and Ancillary Information Facility (NAIF), the ancillary data archive node of NASA's Planetary Data System.

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